Electromagnetic Matlab Solution File Type

Despite the dramatic growth in the availability of powerful computer resources, the EM community lacks a comprehensive text on the computational techniques used to solve EM problems. The first edition of Numerical Techniques in Electromagnetics filled that gap and became the reference of choice for thousands of engineers, researchers, and students. This third edition of the bestselling text reflects the continuing increase in awareness and use of numerical techniques and incorporates advances and refinements made in recent years. Most notable among these are the improvements made to the standard algorithm for the finite-difference time-domain (FDTD) method and treatment of absorbing boundary conditions in FDTD, finite element, and transmission-line-matrix methods. The author also has added a chapter on the method of lines. Numerical Techniques in Electromagnetics with MATLAB®, Third Edition continues to teach readers how to pose, numerically analyze, and solve EM problems, to give them the ability to expand their problem-solving skills using a variety of methods, and to prepare them for research in electromagnetism. Now the Third Edition goes even further toward providing a comprehensive resource that addresses all of the most useful computation methods for EM problems and includes MATLAB code instead of FORTRAN.

This fourth edition of the text reflects the continuing increase in awareness and use of computational electromagnetics and incorporates advances and refinements made in recent years. Most notable among these are the improvements made to the standard algorithm for the finite-difference time-domain (FDTD) method and treatment of absorbing boundary conditions in FDTD, finite element, and transmission-line-matrix methods. It teaches the readers how to pose, numerically analyze, and solve EM problems, to give them the ability to expand their problem-solving skills using a variety of methods, and to prepare them for research in electromagnetism. Includes new homework problems in each chapter. Each chapter is updated with the current trends in CEM. Adds a new appendix on CEM codes, which covers commercial and free codes. Provides updated MATLAB code. Ubiquitous in daily life, electric motors/generators are used in a wide variety of applications, from home appliances to internal combustion engines to hybrid electric cars. They produce electric energy in all electric power plants as generators and motion control that is necessary in all industries to increase productivity, save energy, and reduce

Explore a comprehensive and state-of-the-art presentation of real-time electromagnetic transient simulation technology by leaders in the field Real-Time Electromagnetic Transient Simulation of AC-DC Networks delivers a detailed exposition of field programmable gate array (FPGA) hardware based real-time electromagnetic transient (EMT) emulation for all fundamental equipment used in AC-DC power grids. The book focuses specifically on detailed device-level models for their hardware realization in a massively parallel and deeply pipelined manner as well as decomposition techniques for emulating large systems. Each chapter contains fundamental concepts, apparatus models, solution algorithms, and hardware emulation to assist the reader in understanding the material contained within. Case studies are peppered throughout the book, ranging from small didactic test circuits to realistically sized large-scale AC-DC grids. The book also provides introductions to FPGA and hardware-in-the-loop (HIL) emulation procedures, and large-scale networks constructed by the foundational components described in earlier chapters. With a strong focus on high-voltage direct-current power transmission grid applications, Real-Time Electromagnetic Transient Simulation of AC-DC Networks covers both system-level and device-level mathematical models. Readers will also enjoy the inclusion of: A thorough introduction to field programmable gate array technology, including the evolution of FPGAs, technology trends, hardware architectures, and programming tools An exploration of classical power system components, e.g., linear and nonlinear passive power system components, transmission lines, power transformers, rotating machines, and protective relays A comprehensive discussion of power semiconductor switches and converters, i.e., AC-DC and DC-DC converters, and specific power electronic apparatus such as DC circuit breakers An examination of decomposition techniques used at the equipment-level as well as the large-scale system-level for real-time EMT emulation of AC-DC networks Chapters that are supported by simulation results from well-defined test cases and the corresponding system parameters are provided in the Appendix Perfect for graduate students and professional engineers studying or working in electrical power engineering, Real-Time Electromagnetic Transient Simulation of AC-DC Networks will also earn a place in the libraries of simulation specialists, senior modeling and simulation engineers, planning and design engineers, and system studies engineers.

Design of Smart Power Grid Renewable Energy Systems
The proceedings of the 16th Annual Conference of China Electrotechnical Society
MATLAB-based Finite Element Programming in Electromagnetic Modeling
With MATLAB Applications
MLI Physics Collection

This is the eBook of the printed book and may not include any media, website access codes, or print supplements that may come packaged with the bound book. This title can be used to either complement another electromagnetics text, or as an independent resource. Designed primarily for undergraduate electromagnetics, it can also be used in follow-up courses on antennas, propagation, microwaves, advanced electromagnetic theory, computational electromagnetics, electrical machines, signal integrity, etc. This title also provides practical content to current and aspiring industry professionals. MATLAB-Based Electromagentics provides engineering and physics students and other users with an operational knowledge and firm grasp of electromagnetic fundamentals aimed toward practical engineering applications, by teaching them 'hands on' electromagnetics through a unique and comprehensive collection of MATLAB computer exercises and projects. Essentially, the book unifies two themes: it presents and explains electromagnetics using MATLAB on one side, and develops and discusses MATLAB for electromagnetics on the other. MATLAB codes described (and listed) in TUTORIALS or proposed in other exercises provide prolonged benefits of learning. By running codes: generating results, figures, and diagrams: playing movies and animations: and solving a large variety of problems in MATLAB, in class, with peers in study groups, or individually, readers gain a deep understanding of electromagnetics.

This practical book and accompanying software enables you to quickly and easily work out challenging microwave engineering and high-frequency electromagnetic problems using the finite element method (FEM) Using clear, concise text and dozens of real-world application examples, the book provides a detailed description of FEM implementation, while the software provides the code and tools needed to solve the three major types of EM problems: guided propagation, scattering, and radiation.

This book presents computer programming as a key method for solving mathematical problems. There are two versions of the book, one for MATLAB and one for Python. The book was inspired by the Springer book TCSE 6: A Primer on Scientific Programming with Python (by Langtangen), but the style is more accessible and concise, in keeping with the needs of engineering students. The book outlines the shortest possible path from no previous experience with programming to a set of skills that allows the students to write simple programs for solving common mathematical problems with numerical methods in engineering and science courses. The emphasis is on generic algorithms, clean design of programs, use of functions, and automatic tests for verification.

Accurate knowledge of electromagnetic power system transients is crucial to the operation of an economic, efficient and environmentally-friendly power system network, without compromising on the reliability and quality of the electrical power supply. Simulation has become a universal tool for the analysis of power system electromagnetic transients and yet is rarely covered in-depth in undergraduate programmes. It is likely to become core material in future courses. The primary objective of this book is to describe the application of efficient computational techniques to the solution of electromagnetic transient problems in systems of any size and topology, involving linear and nonlinear components. The text provides an in-depth knowledge of the different techniques that can be employed to simulate the electromagnetic transients associated with the various components within a power system network, setting up mathematical models and comparing different models for accuracy, computational requirements, etc. Written primarily for advanced electrical engineering students, the text includes basic examples to clarify difficult concepts. Considering the present lack of training in this area, many practising power engineers, in all aspects of the power industry, will find the book of immense value in their professional work.

Developing Digital RF Memories and Transceiver Technologies for Electromagnetic Warfare
Dynamic Simulation of Electric Machinery
Springer Handbook of Systematic Musicology
Fundamentals of Nano- and Microengineering, Second Edition
Computational Electromagnetics with MATLAB, Fourth Edition

This unique book presents simple, easy-to-use, but effectiveshort codes as well as virtual tools that can be used byelectrical, electronic, communication, and computer engineers in abroad range of electrical engineering problems Electromagnetic modeling is essential to the design and modelingof antenna, radar, satellite, medical imaging, and otherapplications. In this book, author Levent Sevgi explains techniquesfor solving real-time complex physical problems using MATLAB-basedshort scripts and comprehensive virtual tools. Unique in coverage and tutorial approach, ElectromagneticModeling and Simulation covers fundamental analytical andnumerical models that are widely used in teaching, research, andengineering designs—including mode and ray summationapproaches with the canonical 2D nonpenetrable parallel platewaveguide as well as FDTD, MoM, and SSPE scripts. The book alsoestablishes an intelligent balance among the essentials of EMMODSIM: The Problem (the physics), The Theory and Models(mathematical background and analytical solutions), and TheSimulations (code developing plus validation, verification, andcalibration). Classroom tested in graduate-level and short courses,Electromagnetic Modeling and Simulation: Clarifies concepts through numerous worked problems and quizzesprovided throughout the book Features valuable MATLAB-based, user-friendly, effectiveengineering and research virtual design tools Includes sample scenarios and video clips recorded duringcharacteristic simulations that visually impactlearning—available on wiley.com Provides readers with their first steps in EM MODSIM as well astools for medium and high-level code developers and users Electromagnetic Modeling and Simulation thoroughly coversthe physics, mathematical background, analytical solutions, andcode development of electromagnetic modeling, making it an idealresource for electrical engineers and researchers.

A revised textbook for introductory courses in numerical methods, MATLAB and technical computing, which emphasises the use of mathematical software.

This treatment of modern communication systems presents practical design applications as developed from basic principles. After covering the basic principles of digital and analog baseband and bandpass signals, the text includes practical design examples that illustrate transmitter and receiver blocks, effects of nonlinearities, spectral characteristics and noise performance. It is designed for students studying courses in communication systems, digital and computer communications, or telecommunication systems and standards. Introduces CEM methods, applying the codes that implement them to real-world engineering problems.

Power Integrity for Electrical and Computer Engineers
Introduction to the Finite Element Method in Electromagnetics
Solar Photovoltaics Engineering. A Power Quality Analysis Using Matlab Simulation Case Studies
Engineering Electromagnetics
Programming for Computations - MATLAB/Octave

Engineers around the world depend on MATLAB for its power, usability, and outstanding graphics capabilities. Yet too often, engineering students are either left on their own to acquire the background they need to use MATLAB, or they must learn the program concurrently within an advanced course. Both of these options delay students from solving realistic design problems, especially when they do not have a text focused on applications relevant to their field and written at the appropriate level of mathematics. Ideal for use as a short-course textbook and for self-study Elementary Mathematical and Computational Tools for Electrical and Computer Engineers Using MATLAB fills that gap. Accessible after just one semester of calculus, it introduces the many practical analytical and numerical tools that are essential to success both in future studies and in professional life. Sharply focused on the needs of the electrical and computer engineering communities, the text provides a wealth of relevant exercises and design problems. Changes in MATLAB's version 6.0 are included in a special addendum. The lack of skills in fundamental quantitative tools can seriously impede progress in one's engineering studies or career. By working through this text, either in a lecture/lab environment or by themselves, readers will not only begin mastering MATLAB, but they will also hone their analytical and computational skills to a level that will help them to enjoy and succeed in subsequent electrical and computer engineering pursuits.

The solar Photovoltaic (PV) technology is gaining significant levels and is going to contribute a major share of total generated electricity in the coming years. PV technology is becoming a promising alternative source for fossil fuels. However, Power Quality (PQ) is the major concern that occurs between the grid and an end user. Any typical electrical distribution system exhibits a passive characteristic with respect to power flows when power flows from a substation to load. However, with inclusion of solar PV generators, this behaviour tends to be changed. The main characteristics related to PQ, such as voltage level, frequency, power factor and Total Harmonic Distortion (THD), may be affected. This book presents the analysis of PQ with the integration of grid-connected PV systems as distributed generation. The role of Maximum Power Point Tracking (MPPT) technique is investigated through implementing few basic MPPT techniques. Using the Matlab-simulation platform, the analysis of PQ is demonstrated. This analysis is based on real measurements of THD, Voltage levels, Current levels, DC voltage levels, real power and reactive power flows.

This book provides a comprehensive resource and thorough treatment in the latest development of Digital RF Memory (DRFM) technology and their key role in maintaining dominance over the electromagnetic spectrum. Part I discusses the use of advanced technology to design transceivers for spectrum sensing using unmanned systems to dominate the electromagnetic spectrum. Part II uses artificial intelligence and machine learning to enable modern spectrum sensing and detection signal processing for electronic support and electronic attack. Another key contribution is examination of counter-DRFM techniques. DRFM and transceiver design details and examples are provided along with the MATLAB software allowing the reader to construct their own embedded DRFM transceivers for unmanned systems. It examines the design trade-offs in developing multiple, structured, false target synthesis DRFM architectures and aids in developing counter-DRFM techniques and distinguish false target from real ones. Written by an expert in the field, and including MATLAB™ design software, this is the only comprehensive book written on the subject of DRFM.

Intermediate level electrical engineering text
Electromagnetic Modeling and Simulation
A Gentle Introduction to Numerical Simulations with MATLAB/Octave
Proceedings of the International Conference on Electromagnetic Interference and Compatibility 2001/02 : 21-23 February, 2002, Bangalore, India
Numerical Computing with MATLAB
Revised Reprint

This book and its accompanying CD-ROM offer a complete treatment from background theory and models to implementation and verification techniques for simulations and linear analysis of frequently studied machine systems. Every chapter of Dynamic Simulation of Electric Machinery includes exercises and projects that can be explored using the accompanying software. A full chapter is devoted to the use of MATLAB and SIMULINK, and an appendix provides a convenient overview of key numerical methods used. Dynamic Simulation of Electric Machinery provides professional engineers and students with a complete toolkit for modeling and analyzing power systems on their desktop computers.

The use of MATLAB is ubiquitous in the scientific and engineering communities today, and justifiably so. Simple programming, rich graphic facilities, built-in functions, and extensive toolboxes offer users the power and flexibility they need to solve the complex analytical problems inherent in modern technologies. The ability to use MATLAB effectively has become practically a prerequisite to success for engineering professionals. Like its best-selling predecessor, Electronics and Circuit Analysis Using MATLAB, Second Edition helps build that proficiency. It provides an easy, practical introduction to MATLAB and clearly demonstrates its use in solving a wide range of electronics and circuit analysis problems. This edition reflects recent MATLAB enhancements, includes new material, and provides even more examples and exercises. New in the Second Edition: Thorough revisions to the first three chapters that incorporate additional MATLAB functions and bring the material up to date with recent changes to MATLAB A new chapter on electronic data analysis Many more exercises and solved examples New sections added to the chapters on two-port networks, Fourier analysis, and semiconductor physics MATLAB m-files available for download Whether you are a student or professional engineer or technician, Electronics and Circuit Analysis Using MATLAB, Second Edition will serve you well. It offers not only an outstanding introduction to MATLAB, but also forms a guide to using MATLAB for your specific purposes: to explore the characteristics of semiconductor devices and to design and analyze electrical and electronic circuits and systems.

"Electromagnetics" is a thorough text that enables readers to readily grasp EM fundamentals, develop true problem-solving skills, and really understand and like the material. It is meant as an ""ultimate resource"" for undergraduate electromagnetics." With its comprehensive coverage of the state of the art, this Second Edition introduces basic types of transformers and electric machines. Classifications and characterization—modeling and performance—of power electric transformers (single and multiphase), motors and generators, commercial machines (dc brush, induction dc excited synchronous, PM synchronous, reluctance synchronous) and some new ones (multiphase ac machines, switched reluctance machines) with great potential for industry with rotary or linear motion are all treated in the book. The book covers, in detail, circuit modeling characteristics and performance characteristics under steady state, testing techniques and preliminary electromagnetic-thermic dimensioning with lots of solved numerical examples and special cases to illustrate new electric machines with strong industrialization potential. All formulae used to characterize parameters and performance may be safely used in industry for preliminary designs and have been applied in the book through numerical solved examples of industrial interest. Numerous computer simulation programs in MATLAB® and Simulink® that illustrate performance characteristics present in the chapters are included and many be used as homework to facilitate a deeper understanding of fundamental issues. This book is intended for a first-semester course covering electric transformers, rotary and linear machines, steady-state modeling and performance computation, preliminary dimensioning, and testing standardized and innovative techniques. The textbook may be used by R&D engineers in industry as all machine parameters and characteristics are calculated by ready-to-use industrial design mathematical expressions.

Electronics and Circuit Analysis Using MATLAB
Numerical Techniques in Electromagnetics with MATLAB
2008+ Solved Problems in Electromagnetics
Modern Communication Systems
Using MATLAB/SIMULINK

Artificial intelligence has been one of the fastest-growing technologies in recent years. The market growth is mainly driven by factors such as the increasing adoption of cloud-based applications and services, growing big data, and increasing demand for intelligent virtual assistants. Various end-use industries have also employed artificial intelligence such as retail and business analysis that has also boosted the demand in this market. The major restraint for the market is the limited number of artificial intelligence technology experts. The Book Series on 'Advances in Artificial Intelligence: Reviews' has been launched with the aim to fill-in this gap. The book contains 11 chapters on many different timely topics related to artificial intelligence and its applications. It is written by 21 contributors from academia and industry from 10 countries: Algeria, Germany, India, Iran, Israel, Russia, Slovenia, South Africa, Tunisia and USA.

Building on the unique features that made the first edition a bestseller, this second edition includes additional solved problems and web access to the large collection of MATLABTM scripts that are highlighted throughout the text. The book offers expanded coverage of audio engineering, transducers, and sensor networking technology. It also includes new chapters on digital audio processing, as well as acoustics and vibrations transducers. The text addresses the use of meta-data architectures using XML and agent-based automated data mining and control. The numerous algorithms presented can be applied locally or network-based to solve complex detection problems.

The goal of this book is to discuss fundamentals of electromagnetic wave propagation, especially radiowave propagation, groundwave propagation, surface wave propagation, maritime communication, radar applications in terms of parabolic equation modeling and simulation approaches This is the first book on the guided wave propagation model in nearly two decades. This book will cover several new applications. The book also introduces several simple and sophisticated MATLAB scripts as well as virtual electromagnetic tools for several well-known electromagnetic propagation problems.

A professional guide to the fundamentals of power integrity analysis with an emphasis on silicon level power integrity Power Integrity for Electrical and Computer Engineers embraces the most recent changes in the field, offers a comprehensive introduction to the discipline of power integrity, and provides an overview of the fundamental principles. Written by noted experts on the topic, the book goes beyond most other resources to focus on the detailed aspects of silicon and optimization techniques in order to broaden the field of study. This important book offers coverage of a wide range of topics including signal analysis, EM concepts for PI, frequency domain analysis for PI, numerical methods (overview) for PI, and silicon device PI modeling. Power Integrity for Electrical and Computer Engineers examine platform technologies, system considerations, power conversion, system level modeling, and optimization methodologies. To reinforce the material presented, the authors include example problems. This important book: • Includes coverage on convergence, accuracy, and error analysis and explains how these can be used to analyze power integrity problems • Contains information for modeling the power converter from the PDN to the load in a full system level model • Explores areas of device level modeling of silicon as related to power integrity • Contains example work problems that are related to an individual chapter's subject Written for electrical and computer engineers and academics, Power Integrity for Electrical and Computer Engineers is an authoritative guide to the fundamentals of power integrity and explores the topics of power integrity analysis, power integrity analytics, silicon level power integrity, and optimization techniques.

Computational Electromagnetics for RF and Microwave Engineering
Signal Processing for Intelligent Sensor Systems with MATLAB, Second Edition
Electromagnetic Diffraction Modeling and Simulation with MATLAB
Microwave Circuit Modeling Using Electromagnetic Field Simulation
Quick Finite Elements for Electromagnetic Waves

This comprehensive two semester textbook, now in its 4th edition, continues to provide students with a thorough theoretical understanding of electromagnetic field relations while also providing numerous practical applications. The topics follow a tested pattern familiar to the previous edition, each with a brief, introductory chapter followed by a chapter with extensive treatment, 10 to 30 applications, examples and exercises, and problems and summaries. There is new emphasis on problems, examples and applications based on energy harvesting and renewable energy; additional information on sensing and actuation, new material on issues in energy, power, electronics, and measurements, and an emphasis on aspects of electromagnetics relevant to digital electronics and wireless communication. The author adds and revises problems to emphasize the use of tools such as Matlab; new advanced problems for higher level students; a discussion of symbolic and numerical integration; additional examples with each chapter; and new online material including experiments and review questions. The book is an undergraduate textbook at the upper division level, intended for required classes in electromagnetics. It is written in simple terms with all details of derivations included and all steps in solutions listed. It requires little beyond basic calculus and can be used for self-study. Features hundreds of examples and exercises, many new or revised for every topic in the book. Includes over 650 end-of-chapter problems, many of them new or revised, mostly based on applications or simplified applications. Includes a suite of online demonstration software including a computerized Smith Chart.

This second edition comes from your suggestions for a more lively format, self-learning aids for students, and the need for applications and projects without being distracted from EM Principles. Flexibility Choose the order, depth, and method of reinforcing EM Principles—the PDF files on CD provide Optional Topics, Applications, and Projects.Affordability Not only is this text priced below competing texts, but also the topics on CD (and downloadable to registered users) provide material sufficient for a second term of study with no additional book for students to buy.MATLAB This book takes full advantage of MATLAB's power to motivate and reinforce EM Principles. No other EM books is better integrated with MATLAB. The second edition is even richer and easier to incorporate into course use with the new, self-paced MATLAB tutorials on the CD and available to registered users.

A straightforward, easy-to-read introduction to the finite-difference time-domain (FDTD) method Finite-difference time-domain (FDTD) is one of the primary computational electrodynamics modeling techniques available. Since it is a time-domain method, FDTD solutions can cover a wide frequency range with a single simulation run and treat nonlinear material properties in a natural way. Written in a tutorial fashion, starting with the simplest programs and guiding the reader up from one-dimensional to the more complex, three-dimensional programs, this book provides a simple, yet comprehensive introduction to the most widely used method for electromagnetic simulation. This fully updated edition presents many new applications, including the FDTD method being used in the design and analysis of highly resonant radio frequency (RF) coils often used for MRI. Each chapter contains a concise explanation of an essential concept and instruction on its implementation into computer code. Projects that increase in complexity are included, ranging from simulations in free space to propagation in dispersive media. Additionally, the text offers downloadable MATLAB and C programming languages from the book support site (http://booksupport.wiley.com). Simple to read and classroom-tested, Electromagnetic Simulation Using the FDTD Method is a useful reference for practicing engineers as well as undergraduate and graduate engineering students.

The title of this book, Plasmonics: Principles and Applications, encompasses theory, technical issues, and practical applications which are of interest for diverse classes of the plasmonics. The book is a collection of the contemporary researches and developments in the area of plasmonics technology. It consists of 21 chapters that focus on interesting topics of modeling and computational methods, plasmonic structures for light transmission, focusing, and guiding, emerging concepts, and applications.

Real-Time Electromagnetic Transient Simulation of AC-DC Networks
MATLAB-Based Electromagnetics
Advances in Artificial Intelligence: Reviews
Volume II
Electric Machines

This unique reference book offers a holistic description of the multifaceted field of systematic musicology, which is the study of music, its production and perception, and its cultural, historical and philosophical background. The seven sections reflect the main topics in this interdisciplinary subject. The first two parts discuss musical acoustics and signal processing, comprehensively describing the mathematical and physical fundamentals of musical sound generation and propagation. The complex interplay of physiology and psychology involved in sound and music perception is covered in the following sections, with a particular focus on psychoacoustics and the recently evolved research on embodied music cognition. In addition, a huge variety of technical applications for professional training, music composition and consumer electronics are presented. A section on music ethnology completes this comprehensive handbook. Music theory and philosophy of music are imbedded throughout. Carefully edited and written by internationally respected experts, it is an invaluable reference resource for professionals and graduate students alike.

This extremely valuable learning resource is for students of electromagnetics and those who wish to refresh and solidify their understanding of its challenging applications. Problem-solving drills help develop confidence, but few textbooks offer the answers, never mind the complete solutions to their chapter exercises. In this text, noted author Professor Syed Nasar has divided the book's problems into topic areas similar to a textbook and presented a wide array of problems, followed immediately by their solutions.

This exciting new resource presents a comprehensive introduction to the fundamentals of diffraction of two-dimensional canonical structures, including wedge, strip, and triangular cylinder with different boundary conditions. Maxwell equations are discussed, along with wave equation and scattered, diffracted and fringe fields. Geometric optics, as well as the geometric theory of diffraction are explained. With MATLAB scripts included for several well-known electromagnetic diffraction problems, this book discusses diffraction fundamentals of two-dimensional structures with different boundary conditions and analytical numerical methods that are used to show diffraction. The book introduces fundamental concepts of electromagnetic problems, identities, and definitions for diffraction modeling. Basic coordinate systems, boundary conditions, wave equation, and Green's function problem are given. The scattered fields, diffracted fields, and fringe fields, radar cross section for diffraction modeling are presented. Behaviors of electromagnetic waves around the two-dimensional canonical wedge and canonical strip are also explored. Diffraction of trilateral cylinders and wedges with rounded edges is investigated as well as double tip diffraction using Finite Difference Time Domain and Method of Moments. A MATLAB based virtual tool, developed with graphical user interface (GUI), for the visualization of both fringe currents and fringe waves is included, using numerical FDTD and MoM algorithm and High-Frequency Asymptotics approaches.

This digital collection of twelve book length titles encompasses all of the major subject areas of physics. All twelve titles are combined into one easily downloadable file and are fully-searchable in a Web.pdf, bookmarked, file format. Titles include electromagnetism, particle physics, quantum mechanics, theory of relativity, mathematical methods for physics, computational physics, electrical engineering experiments, multiphysics modeling, solid state physics, radio astronomy, Newtonian mechanics, and physics lab experiments. FEATURES: • Includes 12 full length book titles in one, fully searchable, Web.pdf file • Each book title is preceded by a descriptive page with overview and features • All titles include the complete front matter, text, and end matter from the original printed version • Over 5000 pages of physics information in one file • Complete file downloads in less than two minutes LIST OF TITLES Particle Physics. Robert Purdy, PhD Mathematical Methods for Physics Using MATLAB and Maple. J. Claycomb, PhD The Special Theory of Relativity. Dennis Morris, PhD Quantum Mechanics. Dennis Morris, PhD Basic Electromagnetic Theory. James Babington, PhD Physics Lab Experiments. Matthew M. J. French, PhD Newtonian Mechanics. Derek Raine, PhD Solid State Physics. David Schmool, PhD Multiphysics Modeling Using COMSOL5 and MATLAB. R. Pryor, PhD Radio Astronomy. S. Joardar, PhD Electrical Engineering Experiments. G.P. Chhalotra, PhD

Steady State and Performance with MATLAB®
Nano- and Micro-Electromechanical Systems
Fundamentals of Electromagnetics with MATLAB
Electromagnetics
Complex Electromagnetic Problems and Numerical Simulation Approaches

This book is a self-contained, programming-oriented and learner-centered book on finite element method (FEM), with special emphasis given to developing MATLAB® programs for numerical modeling of electromagnetic boundary value problems. It provides a deep understanding and intuition of FEM programming by means of step-by-step MATLAB® programs with detailed descriptions, and eventually enabling the readers to modify, adapt and apply the provided programs and formulations to develop FEM codes for similar problems through various exercises. It starts with simple one-dimensional static and time-harmonic problems and extends the developed theory to more complex two- or three-dimensional problems. It supplies sufficient theoretical background on the topic, and it thoroughly covers all phases (pre-processing, main body and post-processing) in FEM. FEM formulations are obtained for boundary value problems governed by a partial differential equation that is expressed in terms of a generic unknown function, and then, these formulations are specialized to various electromagnetic applications together with a post-processing phase. Since the method is mostly described in a general context, readers from other disciplines can also use this book and easily adapt the provided codes to their engineering problems. After forming a solid background on the fundamentals of FEM by means of canonical problems, readers are guided to more advanced applications of FEM in electromagnetics through a survey chapter at the end of the book. Offers a self-contained and easy-to-understand introduction to the theory and programming of finite element method. Covers various applications in the field of static and time-harmonic electromagnetics. Includes one-, two- and three-dimensional finite element codes in MATLAB®. Enables readers to develop finite element programming skills through various MATLAB® codes and exercises. Promotes self-directed learning skills and provides an effective instruction tool.

To address the modeling and control of smart grid renewable energy system into electric power systems, this book integrates three areas of electrical engineering: power system engineering, control systems engineering and power electronics The approach to the integration of these three areas differs from classical methods. Due to complexity of this task, the author has decided to present the basic concepts, and then present a simulation test bed in matlab to use these concepts to solve a basic problem in development of smart grid energy system Therefore, each chapter has three parts: first a problem of integration is stated and its importance is described. Then, the mathematical model of the same problem is formulated. Next, the solution steps are outlined. This step is followed by developing a matlab simulation test bed. Each chapter ends with a set of problems and projects. The book is intended be used as textbook for instruction or by researchers. This book can be used as undergraduate text for both electrical and mechanical engineers. The prerequisite for the course is a course in fundamental of electrical engineering.

Society is approaching and advancing nano- and microtechnology from various angles of science and engineering. The need for further fundamental, applied, and experimental research is matched by the demand for quality references that capture the multidisciplinary and multifaceted nature of the science. Presenting cutting-edge information that is applicable to many fields, Nano- and Micro-Electromechanical Systems: Fundamentals of Nano and Microengineering, Second Edition builds the theoretical foundation for understanding, modeling, controlling, simulating, and designing nano- and microsystems. The book focuses on the fundamentals of nano- and microengineering and nano- and microtechnology. It emphasizes the multidisciplinary principles of NEMS and MEMS and practical applications of the basic theory in engineering practice and technology development. Significantly revised to reflect both fundamental and technological aspects, this second edition introduces the concepts, methods, techniques, and technologies needed to solve a wide variety of problems related to high-performance nano- and microsystems. The book is written in a textbook style and now includes homework problems, examples, and reference lists in every chapter, as well as a separate solutions manual. It is designed to satisfy the growing demands of undergraduate and graduate students, researchers, and professionals in the fields of nano- and microengineering, and to enable them to contribute to the nanotechnology revolution.

Annotation This practical "how to" book is an ideal introduction to electromagnetic field-solvers. Where most books in this area are strictly theoretical, this unique resource provides engineers with helpful advice on selecting the right tools for their RF (radio frequency) and high-speed digital circuit design work

Principles and Applications
Elementary Mathematical and Computational Tools for Electrical and Computer Engineers Using MATLAB
Steady State, Transients, and Design with MATLAB
Radio Wave Propagation and Parabolic Equation Modeling
Electromagnetic Simulation Using the FDTD Method

Today, engineering problems are very complex, requiring powerful computer simulations to power them. For engineers, observable-based parameterization as well as numerically computable formsâ ?? with rapid convergent properties if in a seriesâ ?? are essential. Complex Electromagnetic Problems and Numerical Simulation Approaches, along with its companion FTP site, will show you how to take on complex electromagnetic problems and solve them in an accurate and efficient manner. Organized into two distinct parts, this comprehensive resource first introduces you to the concepts, approaches, and numerical simulation techniques that will be used throughout the book and then, in Part II, offers step-by-step guidance as to their practical, real-world applications. Self-contained chapters will enable you to find specific solutions to numerous problems. Filled with in-depth insight and expert advice, Complex Electromagnetic Problems and Numerical Simulation Approaches: Describes ground wave propagation Examines antenna systems Deals with radar cross section (RCS) modeling Explores microstrip network design with FDTD and TLM techniques Discusses electromagnetic compatibility (EMC) and bio-electromagnetics (BEM) modeling Presents radar simulation Whether you're a professional electromagnetic engineer requiring a consolidated overview of the subject or an academic/student who wishes to use powerful simulators as a learning tool, Complex Electromagnetic Problems and Numerical Simulation Approaches - with its focus on model development, model justification, and range of validity - is the right book for you.

This series lecture is an introduction to the finite element method with applications in electromagnetics. The finite element method is a numerical method that is used to solve boundary-value problems characterized by a partial differential equation and a set of boundary conditions. The geometrical domain of a boundary-value problem is discretized using sub-domain elements, called the finite elements, and the differential equation is applied to a single element after it is brought to a "weak" integro-differential form A set of shape functions is used to represent the primary unknown variable in the element domain. A set of linear equations is obtained for each element in the discretized domain. A global matrix system is formed after the assembly of all elements. This lecture is divided into two chapters. Chapter 1 describes one-dimensional boundary-value problems with applications to electrostatic problems described by the Poisson's equation. The accuracy of the finite element method is evaluated for linear and higher order elements by computing the numerical error based on two different definitions. Chapter 2 describes two-dimensional boundary-value problems in the areas of electrostatics and electrodynamics (time-harmonic problems). For the second category, an absorbing boundary condition was imposed at the exterior boundary to simulate undisturbed wave propagation toward infinity. Computations of the numerical error were performed in order to evaluate the accuracy and effectiveness of the method in solving electromagnetic problems. Both chapters are accompanied by a number of Matlab codes which can be used by the reader to solve one- and two-dimensional boundary-value problems. These codes can be downloaded from the publisher's URL: www.morganclaypool.com/page/polycarpou This lecture is written primarily for the nonexpert engineer or the undergraduate or graduate student who wants to learn, for the first time, the finite element method with applications to electromagnetics. It is also targeted for research engineers who have knowledge of other numerical techniques and want to familiarize themselves with the finite element method. The lecture begins with the basics of the method, including formulating a boundary-value problem using a weighted-residual method and the Galerkin approach, and continues with imposing all three types of boundary conditions including absorbing boundary conditions. Another important topic of emphasis is the development of shape functions including those of higher order. In simple words, this series lecture provides the reader with all information necessary for someone to apply successfully the finite element method to one- and two-dimensional boundary-value problems in electromagnetics. It is suitable for newcomers in the field of finite elements in electromagnetics.

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